[illegible] 9

[illegible]

Redeveloped Edition | Class 9 Science | IESC Series

Original NCERT content reimagined with everyday life examples, creative AI-enhanced exercises, and interdisciplinary insights.

[illegible]

[illegible]-[illegible], [illegible] — [illegible], [illegible], [illegible]?

[illegible], [illegible], [illegible] ([illegible] + [illegible] + [illegible]) [illegible]

[illegible] 8 [illegible] *[illegible]* [illegible] — [illegible], [illegible], [illegible], [illegible] "[illegible] (octet)" [illegible]: [illegible], [illegible], [illegible]-[illegible], [illegible] *[illegible]* [illegible], [illegible] *[illegible]* [illegible]? [illegible] — [illegible], [illegible]

9.1 [illegible]

[illegible] 1780 [illegible] — [illegible]: [illegible], [illegible] **(Law of Conservation of Mass)**: [illegible], [illegible]

[illegible]: [illegible] — [illegible]

[illegible] (1743–1794) [illegible], [illegible] — [illegible] "[illegible], [illegible]" — 1789 [illegible] — [illegible], [illegible], [illegible] — [illegible]

[illegible] — [illegible]: [illegible]?

[illegible]: [illegible]-[illegible] [illegible], [illegible], [illegible]

[illegible]:

1. [illegible] ([illegible]) [illegible], [illegible], [illegible], [illegible]
2. [illegible], [illegible], [illegible]
3. [illegible]
4. [illegible] *[illegible]* [illegible] ([illegible]) [illegible]

[illegible]: [illegible], [illegible] — [illegible], [illegible], [illegible], [illegible] — [illegible]

[illegible] — [illegible]: [illegible]

[illegible]: [illegible]; [illegible]

[illegible]: [illegible], 4.0 [illegible] ([illegible]/[illegible]) 2.92 [illegible], [illegible] 1.76 [illegible], 0.72 [illegible], [illegible] 4.44 [illegible]

[illegible] 1: [illegible] = 4.0 + 2.92 = **6.92** [illegible]

[illegible] 2: [illegible] = 1.76 + 0.72 + 4.44 = **6.92** [illegible]

[illegible] 3 — [illegible]: [illegible] = [illegible], [illegible]

> *[illegible]: [illegible] 10 [illegible], [illegible]? [illegible]*

9.2 [illegible]

[illegible], [illegible], [illegible], [illegible]

[illegible], [illegible] 11.1% [illegible] 88.9% [illegible] **(Law of Constant Proportions)** ([illegible])[illegible]

[illegible]: [illegible]

[illegible] ([illegible], NaCl) [illegible] — [illegible] 39.3% [illegible] 60.7% [illegible] — [illegible], [illegible] NaCl [illegible]: [illegible] "[illegible]" [illegible], [illegible], [illegible] ([illegible], [illegible], [illegible]) [illegible]

[illegible]: "[illegible]" [illegible]?

[illegible] *[illegible]* [illegible], [illegible] 2 [illegible] 16 [illegible] 18 [illegible] — [illegible] 1:8 [illegible] — [illegible], [illegible], [illegible]-[illegible], [illegible]

9.3 [illegible]

[illegible], [illegible] 1808 [illegible] — [illegible], [illegible]

[illegible]: [illegible]

[illegible] (1766–1844) [illegible], [illegible] **(atomic theory)** [illegible] (postulates) [illegible]:

- [illegible]-[illegible], [illegible]
- [illegible] — [illegible], [illegible]
- [illegible]
- [illegible]-[illegible]-[illegible]
- [illegible]
- [illegible]

[illegible]: [illegible]

[illegible], [illegible], [illegible] — [illegible] — [illegible] *[illegible]* [illegible], [illegible]

> ***[illegible]-[illegible] [illegible]:** [illegible]: 2 [illegible] 16 [illegible] 18 [illegible]: [illegible], [illegible], [illegible], [illegible]?*

9.4 [illegible]

[illegible] 8 [illegible] ([illegible]) [illegible] (valence shell) [illegible] — [illegible], [illegible] "[illegible] (octet)"[illegible] [illegible], [illegible], [illegible]

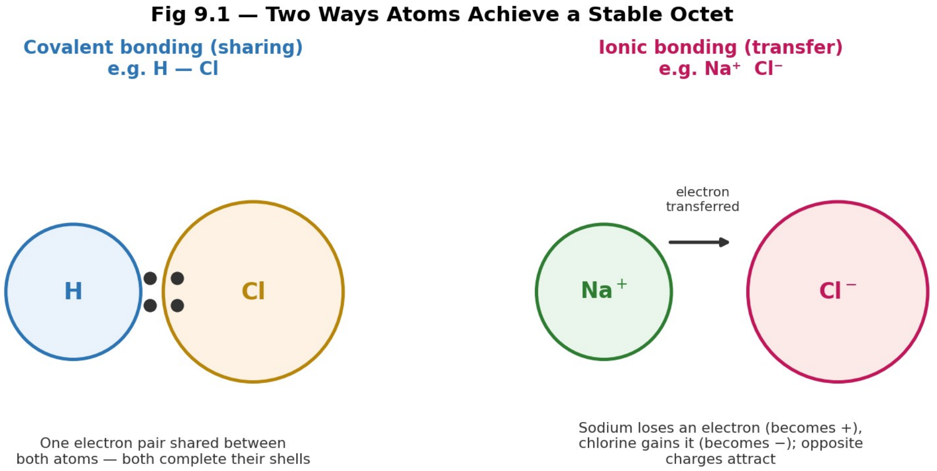
Fig 9.1 — Two Ways Atoms Achieve a Stable Octet
Covalent bonding (sharing)
e.g. H — Cl
Ionic bonding (transfer)
e.g. Na⁺ Cl⁻
H
Cl
electron transferred
Na⁺
Cl⁻
One electron pair shared between both atoms — both complete their shells
Sodium loses an electron (becomes +), chlorine gains it (becomes −); opposite charges attract

[illegible] 9.1 — [illegible], [illegible]: [illegible] ([illegible]) [illegible] ([illegible])[illegible]

9.4.1 [illegible] — [illegible]

[illegible] — [illegible] (non-metal) — [illegible], [illegible]-[illegible] **(share)** [illegible]-[illegible], [illegible] **(covalent bond)** [illegible] ([illegible] "[illegible]/duet" [illegible]) [illegible] ([illegible]) [illegible], HCl, [illegible], [illegible]

9.4.2 [illegible] — [illegible]

[illegible] ([illegible] "[illegible]") [illegible] ([illegible]), [illegible] **(transfer)** [illegible]

[illegible]: [illegible], [illegible] **(cation)** [illegible], [illegible] **(anion)** [illegible]-[illegible], [illegible] **(ionic bond)** [illegible] ([illegible]) [illegible] ([illegible]) [illegible] — [illegible] — [illegible]: Na^+ [illegible] Cl^- [illegible], [illegible]-[illegible] [illegible]

> **[illegible]: [illegible]**
>
> [illegible] (NaCl) [illegible] — [illegible] — [illegible] ([illegible])[illegible] ([illegible], [illegible], [illegible]) [illegible], [illegible] *[illegible]* [illegible] — [illegible], [illegible]: [illegible]

9.5 [illegible]

[illegible] **(valency)** [illegible] — [illegible], [illegible], [illegible], [illegible] 9.1 [illegible], [illegible]

9.5.1 [illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Na^+	1	[illegible]	Cl^-	1
[illegible]	K^+	1	[illegible]	F^-	1
[illegible]	Ca^{2+}	2	[illegible]	O^{2-}	2
[illegible]	Mg^{2+}	2	[illegible]	S^{2-}	2
[illegible]	Al^{3+}	3	[illegible]	OH^-	1
[illegible]	NH_4^+	1	[illegible]	CO_3^{2-}	2
[illegible]	Zn^{2+}	2	[illegible]	SO_4^{2-}	2
[illegible] ([illegible])	Fe^{3+}	3	[illegible]	NO_3^-	1

[illegible]-[illegible] **(criss-cross method)** [illegible]: [illegible], [illegible], [illegible] (1 [illegible])[illegible]

> **[illegible] — [illegible]: [illegible]-[illegible]**

[illegible] — [illegible] ([illegible]-[illegible]) [illegible]:

[illegible]: C, Cl[illegible]: C = 4, Cl = 1[illegible]-[illegible]: C [illegible] 1 [illegible] ([illegible]), Cl [illegible] 4 [illegible]

[illegible]**: CCl_4**

[illegible] ([illegible]) [illegible]:

[illegible]: H, S[illegible]: H = 1, S = 2[illegible]-[illegible]: H [illegible] 2 [illegible], S [illegible] 1 [illegible] ([illegible])[illegible]

[illegible]**: H_2S**

9.5.2 [illegible]

[illegible], [illegible], [illegible], [illegible], [illegible] "-[illegible]" ([illegible] "-[illegible]"/"-[illegible]") [illegible]

[illegible] — [illegible]: [illegible]-[illegible]

[illegible]: [illegible] 9.1 [illegible]-[illegible], [illegible]:

1. [illegible] (Mg^{2+} [illegible] Cl^-)
2. [illegible] — [illegible] (Ca^{2+} [illegible] O^{2-})
3. [illegible] (Al^{3+} [illegible] SO_4^{2-})
4. [illegible] (NH_4^+ [illegible] CO_3^{2-})

[illegible]: [illegible] Na^+ ([illegible] 1) [illegible] HCO_3^- ([illegible] 1) [illegible], [illegible], $NaHCO_3$, [illegible]?

9.6 [illegible]

[illegible]-[illegible], [illegible]:

[illegible]: [illegible], [illegible]?

[illegible]	[illegible]	[illegible]
[illegible]/[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible] ([illegible]

[illegible]	[illegible]	[illegible]
		[illegible])
[illegible]	[illegible] ([illegible])	[illegible]

[illegible], [illegible], [illegible], [illegible] (fatty) [illegible] — [illegible] *[illegible]* [illegible]; [illegible]

9.7 [illegible]

[illegible] **(molecular mass)** [illegible], [illegible]-[illegible] **(u)** [illegible]

[illegible] — [illegible]: [illegible]

[illegible], **H_2O:** H [illegible]-[illegible] ≈ 1 u, O ≈ 16 u[illegible]

[illegible] = 2(1) + 1(16) = 2 + 16 = **18 u**

[illegible], **CO_2:** C [illegible]-[illegible] ≈ 12 u, O ≈ 16 u[illegible]

[illegible] = 1(12) + 2(16) = 12 + 32 = **44 u**

> *[illegible]: [illegible] 18 u [illegible], [illegible]-[illegible] 2 [illegible] : 16 [illegible] (1:8) [illegible] — [illegible]? [illegible]*

9.8 [illegible]-[illegible]

[illegible]-[illegible] — [illegible] (lattice) [illegible] — [illegible] "[illegible]" [illegible], [illegible] **[illegible]-[illegible] (formula unit mass)** [illegible]: [illegible]-[illegible] [illegible]-[illegible]

[illegible] — [illegible]: [illegible]-[illegible]

[illegible], **Na_2O:** Na [illegible]-[illegible] ≈ 23 u, O ≈ 16 u[illegible]

[illegible]-[illegible] = 2(23) + 1(16) = 46 + 16 = **62 u**

[illegible], **$Ca(NO_3)_2$:** Ca [illegible]-[illegible] ≈ 40 u, N ≈ 14 u, O ≈ 16 u[illegible]

[illegible] = 40 + 2×[14 + 3(16)] = 40 + 2×62 = 40 + 124 = **164 u**

[illegible] — [illegible]: [illegible]

[illegible]: [illegible] (Na = 23, H = 1, C = 12, O = 16, Ca = 40, Cl = 35.5) [illegible], [illegible]:

1. [illegible], $NaHCO_3$, [illegible]
2. [illegible], $NaCl$, [illegible]
3. [illegible]/[illegible], $CaCO_3$, [illegible]

[illegible], [illegible] "[illegible]" [illegible]? ([illegible]: [illegible] — [illegible])

[illegible]

[illegible]	[illegible]	[illegible]
[illegible]	[illegible] = [illegible]	[illegible]
[illegible]	[illegible]	[illegible] 39.3% [illegible], 60.7% [illegible]
[illegible]	[illegible], [illegible]	[illegible]
[illegible]	[illegible]-[illegible]	[illegible], [illegible], [illegible]
[illegible]	[illegible]	[illegible], [illegible]
[illegible]-[illegible]	[illegible]-[illegible]	CCl_4, H_2S, $NaHCO_3$
[illegible]	[illegible]-[illegible] ([illegible])	[illegible] = 18 u, CO_2 = 44 u
[illegible]-[illegible]	[illegible]-[illegible] ([illegible])	[illegible] = 62 u

[illegible], [illegible], [illegible] — [illegible]

[illegible]

1. [illegible]
2. [illegible]
3. [illegible]-[illegible], [illegible]

[illegible]

1. [illegible] 5.3 [illegible], 6 [illegible] 2.2 [illegible], 0.9 [illegible], [illegible], [illegible]
2. [illegible] ([illegible]) [illegible], [illegible]?
3. [illegible] (Al^{3+} [illegible] O^{2-}) [illegible], [illegible]-[illegible] (Al = 27, O = 16) [illegible]

[illegible]

1. **[illegible]-[illegible]:** [illegible], [illegible]
2. **[illegible]:** [illegible] ([illegible], [illegible], [illegible], [illegible]) [illegible]-[illegible] [illegible]
3. **[illegible]-[illegible]:** [illegible]-[illegible] [illegible]
4. **AI [illegible] — [illegible]:** [illegible] "[illegible], [illegible]", [illegible] ([illegible]) [illegible], [illegible]? ([illegible]: [illegible])

[illegible] — [illegible]

[illegible] A: [illegible]

[illegible] ([illegible]) [illegible], [illegible]-[illegible], [illegible] (uncertainty) [illegible]

[illegible] B: [illegible]-[illegible] [illegible]

[illegible] ([illegible], [illegible], [illegible], [illegible]) [illegible]-[illegible] [illegible]

[illegible] C: [illegible]

[illegible], [illegible], [illegible]

[illegible] "[illegible]" [illegible]? [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]-[illegible] [illegible] [illegible] [illegible] [illegible] ([illegible] [illegible] [illegible] [illegible]) [illegible] [illegible] [illegible] [illegible] [illegible] [illegible], [illegible] [illegible]

[illegible] [illegible] [illegible]! [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible], [illegible] [illegible] [illegible] [illegible] [illegible]-[illegible] [illegible] [illegible], [illegible] [illegible] [illegible] [illegible] 200 [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] ⚗[illegible]